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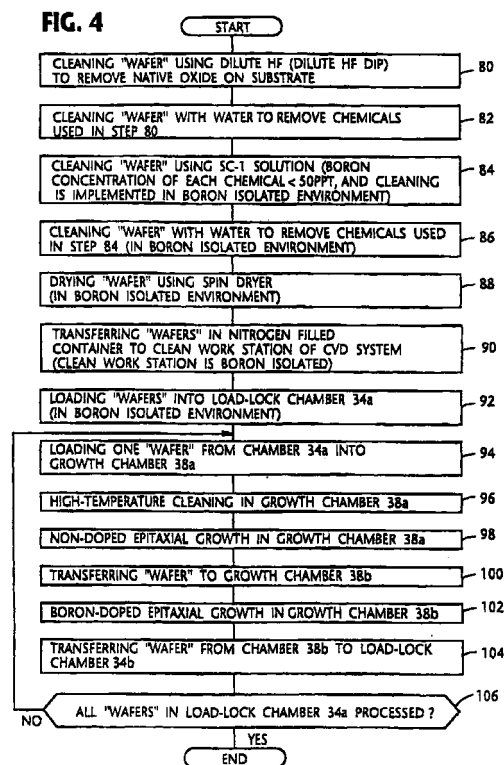
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(54) A method for boron contamination reduction in IC fabrication

(57) In order to reduce boron concentration between a silicon substrate and an Si or Si<sub>1-x</sub>Ge<sub>x</sub> layer which is epitaxially grown in a CVD (chemical vapor deposition) apparatus, the silicon substrate is pre-treated, before being loaded into the CVD apparatus, such as to prevent the substrate from being contaminated by boron in a clean room. Further, in accordance with one embodiment, a CVD growth chamber itself is cleaned, before the substrate is loaded into the growth chamber, using an F<sub>2</sub> gas at a predetermined temperature of the substrate, thereby to remove boron residues in the growth chamber;





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# EUROPEAN SEARCH REPORT

Application Number  
EP 97 12 0374

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	CAYMAX M R ET AL: "Optimization of Si-wafer cleaning and the use of buffer-layers for epitaxial growth of SiGe-layers by VLPCVD at T=650 C" CHEMICAL SURFACE PREPARATION, PASSIVATION AND CLEANING FOR SEMICONDUCTOR GROWTH AND PROCESSING SYMPOSIUM, SAN FRANCISCO, CA, 27 - 29 April 1992, pages 461-466, XP002111368 1992, Pittsburgh, PA, USA, Mater. Res. Soc, USA * the whole document *	1-6	H01L21/306 H01L21/205
A	STEVIE F A ET AL: "Boron contamination of surfaces in silicon microelectronics processing: characterization and causes" TOPICAL CONFERENCE ON THE PROCESSED INDUCED PARTICULATE CONTAMINATION, TORONTO, ONT., CANADA, 8. OCT. 1990, vol. 9, no. 5, pages 2813-2816, XP002111369 Journal of Vacuum Science & Technology A (Vacuum, Surfaces, and Films), Sept.-Oct. 1991, USA ISSN: 0734-2101 * the whole document *	1,3,4, 12,16	TECHNICAL FIELDS SEARCHED (Int.Cl.6)  H01L C23C
A	HASHIMOTO T ET AL: "Boron spike effect on cut-off frequency and early voltage in SiGe HBTs" ESSDERC '95. PROCEEDINGS OF THE 25TH EUROPEAN SOLID STATE DEVICE RESEARCH CONFERENCE, THE HAGUE, NETHERLANDS, 25 - 27 September 1995, pages 501-504, XP002111370 1995, Gif sur Yvette, France, Editions Frontieres, France ISBN: 2-86332-182-X * the whole document *	7,8,12	
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>5 August 1999</b>	Examiner <b>Köpf, C</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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Application Number  
EP 97 12 0374

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	IYER S S ET AL: "Origin and reduction of interfacial boron spikes in silicon molecular beam epitaxy" APPLIED PHYSICS LETTERS, vol. 52, no. 6, 8 February 1988 (1988-02-08), pages 486-488, XP002111371 ISSN: 0003-6951 * the whole document *	7	
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 302 (C-616), 12 July 1989 (1989-07-12) & JP 01 093412 A (IWATANI INTERNATL CORP), 12 April 1989 (1989-04-12) * abstract *	20	
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<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 97 12 0374

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82